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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,116	04/12/2004	Kevin J. Torek	MI22-2559	3522

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/823,116

Applicant(s)

TOREK ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6 is/are allowed.
- 6) ☒ Claim(s) 7-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/12/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 7, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Harada et al. (US 5,631,868).

Harada describes a method for removing an organic compound such as photoresist from a semiconductor substrate comprising: feeding an feed gas consisting of an oxygen gas (having a purity of at least 99.999%) supplemented with CO or CO<sub>2</sub> through an ozone generator to generate ozone (this feed gas would comprise less than or equal to 0.001% of N<sub>2</sub> because it contains no nitrogen); and contacting the ozone with the resist on the substrate to remove the resist (claim 1; col. 2, line 56-60; col. 7, line 5, line 38-40; col. 9, line 26-30).

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada as applied to claim 7 above, and further in view of Ury et al. (US 4,885,047).

Unlike claimed invention, Harada doesn't describe irradiating at least some of the ozone with UV prior to the contacting. Ury describes a same method of removing resist wherein he teaches of using ozone and irradiating the resist with during the process. Some of the ozone would have to be irradiated with UV to create ozone fragments prior to the contacting and proximate the resist during the process. (col. 4, line 19-39). It would have been obvious for one skill in the art to modify Harada in light of Ury because Ury teaches that UV may provide an enhancement of the stripping time.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada as applied to claim 7 above, and further in view of De et al. (JP411219926A).

Unlike claimed invention, Harada doesn't describe mixing ozone with water vapor prior to contacting. However, removing resist with ozone and water vapor has been known to one skill in the art at the time of the invention such as one taught by De (ab.). Therefore, at the time of the invention one skill in the art would find it obvious to remove resist in light of De by using ozone and water vapor, which would enhances the removal process since water would provide another source of oxidizing agent to remove the photoresist with an anticipation of an expected result.

6. Claims 11-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada as applied to claim 7 above, and further in view of Mullee (US 6,306,564).

Unlike claimed invention, above prior art doesn't describe mixing the ozone with organic solvent vapor prior to the contacting. Mullee describes a method of removing the photoresist wherein the photoresist is removed using a combination of ozone and organic solvent such as

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acetone, isopropanol (col. 4, line 11-30). It would have been obvious for one skill in the art to add organic solvents into the mixture because Mullee teaches that organic solvents would remove organic contaminants from the wafer surface (col. 4, line 22-24).

Mullee describes the chemicals are heated and carried by a gas into the reaction chamber so that less chemical is needed to remove the photoresist (summary; col. 2, line 56-60). This would provide organic solvent vapors.

Referring to claims 14-15, even though above prior art doesn't describe the metal layers exposing to chemicals (i.e. ozone) are  $\text{Al}_2\text{O}_3$  or platinum; however, using the photoresist to etch a substrate that includes aluminum oxide or platinum are known to one skill in the art and would depending on the type of device being processed (please see below cited art). Removing the resist would also expose the aluminum oxide or Pt to the ozone.

Referring to claim 17, it would be obvious that the solvents' reservoirs can be anywhere within or outside the chamber as long it could provide organic vapor for the resist removal.

Referring to claims 20, 21, it would have been obvious for one skill in the art to use other organic solvent such as cyclohexanone to remove photoresist with an anticipation of an expected result.

7. Claims 25-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada, Mullee and further in view of Ury et al. (US 4,885,047).

Unlike claimed invention, above prior art doesn't describe irradiating at least some of the ozone with UV prior to the contacting. Ury describes a same method of removing resist wherein he teaches of using ozone and irradiating the resist with during the process. Some of the ozone would have to be irradiated with UV to create ozone fragments prior to the contacting and

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proximate the resist during the process. (col. 4, line 19-39). It would have been obvious for one skill in the art to modify above prior art in light of Ury because Ury teaches that UV may provide an enhancement of the stripping time.

8. Nomoto (US 6,133,603) and Dahlheim et al. (US 5,540,047) cited to show prior art.

#### ***Allowable Subject Matter***

9. Claims 1-6 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Claims 1-6 are allowable because the closest prior art, Harada, doesn't describe using the feed gas comprising 99.999% by V of oxygen. He describes using oxygen supplemented with 12-20 % of CO or CO<sub>2</sub>.

#### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-35 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 6,740,597. Although the

conflicting claims are not identical, they are not patentably distinct from each other because they both describe a method of removing the photoresist using the same gases and concentration.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-3:30; with alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DVD  
11/8/04

